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Inaugural Thesis
By

George Fleming.

Virginia.

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Thesis on Tetanus

Induced by observations, which I have made on tetanus, and the different modes of treating it, I have related it as the disease, on which I shall make the following remarks, and conscious of their defects, humbly submit them to deeper and more thorough investigation.

This disease may make its appearance in different climates and at different seasons of the year but it most frequently appears in hot weather and warm climates. The whole human race whatever their age sex or species are also liable to it and by some authors it has been mentioned among of the *opprobria medicorum*. The cases which have come under my notice were confined to strong robust men or boys none of them over forty years of age. I do not wish to infer from this that the disease is more frequent among men than among women

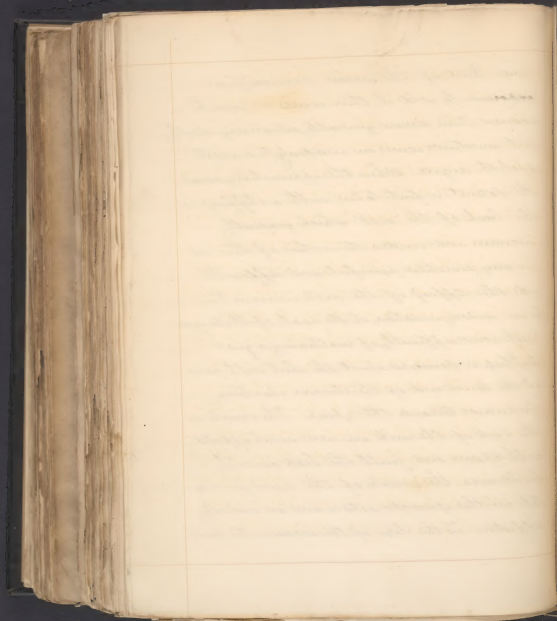
Wm. M. McKim

Letter of introduction to the
Hon. Secy. of the Navy
Washington D. C.
Dear Sir
I have the honor to acknowledge the receipt of your letter of the 10th inst. in relation to the proposed purchase of the schooner "Albatross" for the service of the Navy. I am very glad to hear that you are so interested in the subject, and I am sure that the Government will be pleased to consider the matter with the utmost attention. I have the honor to be, Sir, your obedient servant.

Wm. M. McKim

but I think that it might be more satisfactorily accounted for by this being more frequently exposed to such accidents as are calculated to produce the disease. The causes of this disease we well know to be various, Such as gun shot wounds, compound fractures, lacerations punctures and various other injuries done to the body, or it may be produced by exposure to cold after great excitement ~~or~~ or fatigue causing a suppression of perspiration it is also said to be produced by irritating substances in the stomach and bowels, such as worms and it may likewise arise from surgical operations. The violence of this disease depends much upon its cause for if it arises from punctures lacerations or any injury done to the body it is more fatally generally coming on about the eighth day, but in this there are many varieties for in some instances it does not appear for a much longer

time. But if the disease proceeds from exposure to cold it then comes on much sooner. This disease generally advances gradually, but sometimes comes on suddenly to a most violent degree. When the approach is gradual the patient is first taken with a stiffness in the back of the neck which gradually increases and renders the motion of the head in any direction painful and difficult. As this stiffness of the neck increases there is an uneasy sensation at the root of the tongue with some difficulty of swallowing, a great tightness is perceived about the chest with pain at the lower end of the sternum shooting backwards towards the spine. The muscles on the back of the neck are now much affected with spasm and pull the head directly backwards, the muscles of the lower jaw also take on this spasmodic action and are violently affected. In this stage of the disease writers have



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given the name of locked jaw or trismus
and with some patients the spasmic affection
extends no farther but when the disease
advances the spasms become more general and
affect the muscles of the whole spine so as to bend
the trunk of the body backwards, which
writers call opisthotonos. During the whole course of
the disorder the abdominal muscles are violently
affected with spasm, the belly is strongly contracted
and feels very hard, the bowels are costive and both
the flexor and extensor muscles of the lower
extremities are simultaneously affected so as to keep
the limbs rigidly extended. The flexor and
extensor of the head and trunk at length become
so much affected as mutually to balance each others
action and to keep the head and trunk so rigidly
extended and straight as to render it incapable of
motion in any direction. The arms which had been
but little affected before are now likewise rigidly
extended, the tongue being also affected with spasm

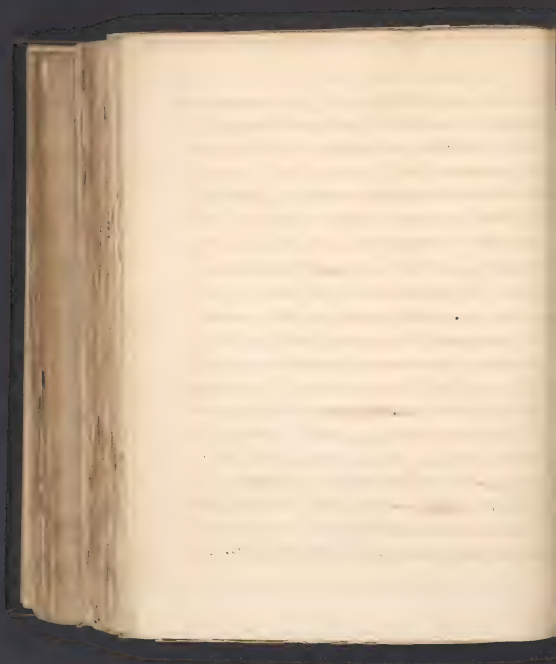
is sometimes convulsively darted out of the mouth
and much injured by the teeth and it is to
this state of the disease that the term of
crisis has been strictly applied. The spasms
are now much more frequently than they did before
the slightest cause being sufficient to bring them on.
The face also becomes affected the forehead is
congested the eyes are fixed in their sockets
the countenance is much distorted and expresses
great distress and notwithstanding the great
duration of the spasms which sometimes take
place in this disease they are apt to relieve
with renovated force and midst. relief is
procured, the patient inevitably perishes.
We seldom find any irregularity in the pulse
until during the spasm when it is small
and irregular and the respiration is affected in
the same way during spasm but when
it subsides the pulse and respiration
become quite regular and natural.



The modes of treating this disease as recommended
by different writers, are numerous and various.

The practitioner first finds out the cause of
the disease, and if it proceed from a wound
or puncture, he carefully extracts any extraneous
body that may have lodged therein. he then
dilates the wound freely, and pours something
stimulating into it, such as ~~the~~ Terebinthine,
or spirits of turpentine. The different caustics,
are also frequently applied to the wound,
and afterwards it is covered with a soft
dressing, to produce suppuration, and not
unfrequently the wounded part is amputated.

Opium, Phlegm has been more extensively used
in this disease than any other article of the
Materia medica, and frequently with the
best effects, the practitioner not taking into
consideration, the quantity used, but the effect
produced on the patient by its use. Some
suppose, that joining it with camphor or



must, increases its effect. The external
 application of it to the surface of the
 body is also recommended, by Thomas, as
 being useful in this disease. The warm
 bath has also been used, but Doctor
 Keilany, in his writings, avenges, that
 instantaneous death has followed warm
 bathing, in tetanus, and in Doctor Doreys
 edition, of Profers work on surgery, we
 see a similar account, of the effects of
 warm bathing, and from other works,
 that the warm bath has done harm, and
 even occasioned death. Bleeding has been
 employed, but seldom with any evident
 benefit. Doctor Rush mentions that he
 found it useful, in one case, which came
 under his care in the year 1794. Mercury
 has often been used, but without any apparent
 benefit, and a late celebrated writer tells us
 that he has never seen it of the least service,



in symptomatic tetanus. Tonics, particularly the
 Peruvian-bark and wine, have been recommended
 by Doctor Rush, and in the New York
 Medical Repository, for 1779, is mentioned a
 case of tetanus, arising from the fracture
 of a finger in the wrist, which was
 successfully treated by Doctor Hoffman, with
 wine alone. Cold bathing has also been
 employed, and is highly recommended. Doctor
 Collinson ~~that~~ it is a remedy, which in
 numerous trials, has been found to be of great
 service in this disease. Cooper in his work on
 surgery, recommends it as one of the most effectual
 modes of treating this disease. Doctor Elphinstone also
 tells us, that in all the instances of
 recovery from tetanus, which had taken place
 under his care, the cold bath had been used,
 and in combination with bark and wine,
 the cold bath appears to stand, decidedly,
 prominent, in the list of remedies, now

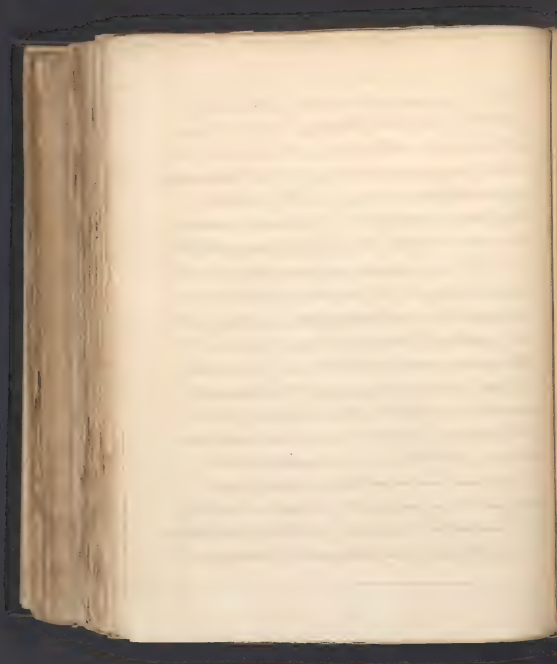


employed in labour, and as illustrations of their efficacy, I will relate the following cases.

In the latter end of July 1824, a man being employed in cutting some oats, for the purpose of feeding his horses, cut his finger, just across the middle of the second bone, and divided it entirely, except a small portion of the integuments, on the inside of it. The pendulous end of the finger was soon repaired, but an ill conditioned ulcer followed. Now as the remote and exciting cause of this disease, of hard to get with more certainty as well as violence where the degree of heat, excitement and fatigue which the finger might previously have undergone was great, this appears to have been a case well calculated to produce, the weather being warm and the patient much fatigued by the labour of the day,



This wound did not unite by the first intentions, but the bleeding from it was copious, and after a day or two, it put on a most unfavourable aspect, not suppurating, being entirely dry, and insensible to all the stimulating applications, which were used to rouse its sensibility. On the fifth day after the accident, in consequence of some fatigue which he underwent, he was taken with most of the symptoms of tetanus, as a stiffness of the neck, difficulty of swallowing, pain about the region of the stomach, an inclination to bend forward, spasms of the abdominal muscles, and thighs, pain shooting from the extremity of the sternum, backwards towards the spine, with tension and rigidity about the thorax, and, when asleep, his slumbers were interrupted by frequent startings, accompanied with subcutaneous tenderness. Obstinate constipation also, of the bowels existed, which was removed



by gentle purgatives and about the first of
 august the cold bath, bark and wine were freely
 used with opium to mitigate the spasm. The
 cold water was poured upon the patient from
 some height in one gradual but continued
 stream. He was then, wiped dry, put to bed, and
 the bark and wine administered freely.

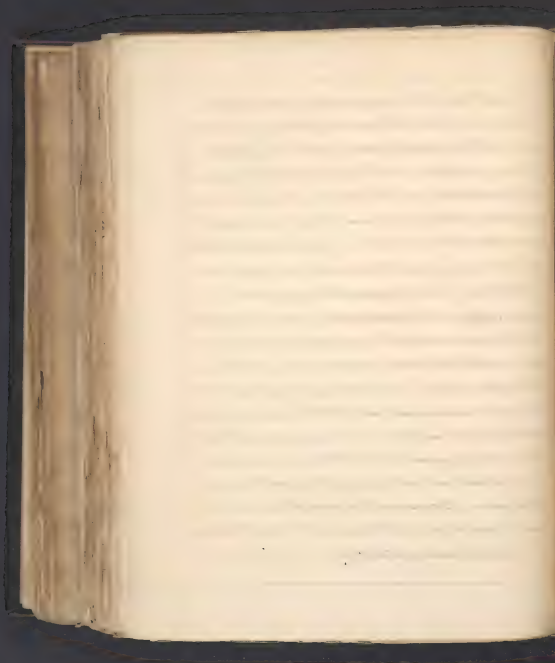
These means were repeated every two hours, and
 sometimes even more frequently when the
 circumstances of the case demanded them;
 nor was the presence of opium overlooked, in
 the severity of the spasm, it was invariably found
 to allay pain, and mitigate the sufferings of the
 patient; And though the attacks would return,
 the benefit resulting from this course of treatment,
 was evident, for their recurrence was attended
 both with a diminution of force and
 frequency, and would again and again be as
 promptly removed by the use of the same means.
 Finding, however, that the disease did not appear



if it would be entirely eradicated by this course
 of treatment, the finger was amputated, on the
 supposition that the disease would give way
 entirely, to the above mode of treatment, after the
 exciting cause had been removed. The operation
 was performed just above the wounded part,
 and the stump put on a far more pleasing appearance,
 suppurating kindly and soon healed. During
 the whole course of the healing process the
 disease continued, though in a milder form.
 In about a week after the operation, mercury
 was resorted to, with the hope of producing
 ptyalism. The mild muriate, was the preparation
 of mercury, first used, of which one grain
 was given three times per day. This mode of
 using it, however, was found inadequate
 to produce the desired effect, and it was,
 then, given in much larger quantities, but with
 the same result, neither did it act upon the
 bowels. The mild muriate was then,



exchanged for the unguentum mercuriale
 castoreum, which was used in the way of friction
 upon the internal parts of the thigh, the
 groins, and also, in the axilla; till it produced
 such excoriation of the parts, to which it was
 applied; that a more extensive trial of it
 was thought inexpedient, and it was therefore
 discontinued; and the corrosive mercurial was
 substituted. This preparation was used
 externally, but produced so great distress of
 the stomach, that it was abandoned as had been
 done with the other mercurial preparations.
 The time taken up in the employment of
 the mercurial medicine, was about three or four weeks,
 without their action ever being apparent on
 the salivary glands, but the disease appeared
 less violent as well as less frequent in its
 recurrence. Mercurial fumigations were
 next resorted to, but the result was the same
 as in the preceding attempts.



The mercurials were now entirely abandoned, as they could not be so exhibited, as to produce their desired effects, and had been productive of no apparent benefit. The cold water, bark and wine, and also the opium in the urgency of the case demanded it, were now used freely as they appeared to be the only means, by which the disease could be subdued. It was accordingly persisted in for a week or ten days, with the happy effect of an almost entire removal of every inflamed and morbid action. This plan of treatment, however, was continued for several days after an entire removal of all the symptoms of the disease, so as to eradicate entirely the disposition to a recurrence. During those several days, he continued entirely free from all the symptoms of the disease, though somewhat costive from the quantity of opium, which he had used. The quantity of Peruvian bark employed in this case,



was nearly two pounds, with a proportionate quantity of wine, and the opium, when the spasms were severe, was frequently given two or three grains at a time repeated according to the urgency of the symptoms; The sulphuric ether was occasionally substituted for the opium, and apparently with some benefit, and the costive state of the body was easily removed, by the use of mild aperients, such as the sulphat of magnesia or the sulphat of soda. His diet during this time, was light, and nutritive, and his appetite for food but little, if at all impaired; At this time after an entire absence of all the symptoms of the disease, for a week or ten days, being considered entirely well, the patient resumed his former occupations of labour, and was again taken with all the symptoms of Cholera, which distorted the features of the face in a most alarming



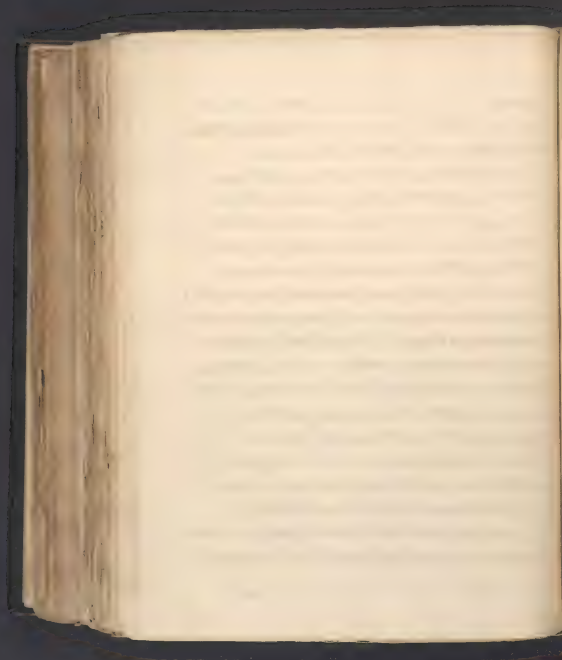
manner, and were not infrequently so violent
 as to cause him to be entirely frantic. The cold
 bath, in conjunction with the bark and wine,
 was immediately resorted to, and with the
 happiest effect. The first shower of the water
 dispelling most of the symptoms of the disease,
 and, where they continued after the patient
 was put to bed, the exhibition of an
 opiate would generally remove them,
 but this interval was of short duration, as
 the attacks would recur in a few hours,
 though each succeeding one was attended
 with much less violence than the one
 preceding it, and were as easily removed by
 resorting to the same means, as before,
 particularly the cold bath, succeeded up
 by the bark and wine. Other spirits
 were once or twice substituted for the wine,
 in consequence of the wine not being at hand,
 and they were sometimes used to such an extent,



to produce intoxication. Though the benefit resulting from the spirits in this case, was inferior to that resulting from the use of the wine, it was certainly entitled to a considerable portion of credit. The patient however, being induced for some purpose to get out of bed; and walk across the room, was taken with violent spasms, particularly of the muscles of the head and neck, and the flexors and extensors were so much affected, as to render the head immovable in any direction, during their continuance. At the same time, his arms were rigidly extended, the buccinator and masseter muscles were also affected with violent spasms, and his jaws fast clirched. The cold water was instantly resorted to with the most astonishing benefit, for by its use the affection of the jaws as well as many of the other unpleasant symptoms, were dispensed, and the patient



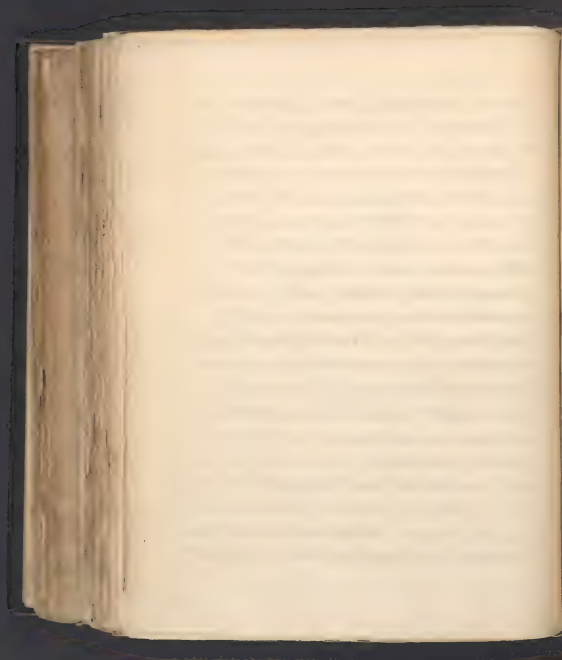
condition, as here compared with what it had been but a few moments before, was tranquillity. Nevertheless, the spasms continued to recur for seven or eight days, but in every instance being treated with the cold affusions, in conjunction with the bark and wine, and occasionally an opiate, as the symptoms demanded it, were as easily removed as before, and gradually diminishing in force and frequency, they disappeared entirely in six or eight days, but left the patient in a very debilitated condition, with a distressing irritation about the stomach, accompanied with a sense of heat. This was thought to have been produced by the great quantity of stimulants, which he had taken in, and consequently the further use of the bark and wine, was not thought expedient. It was therefore discontinued, but the cold bathing was still practiced occasionally for ten or eleven days.



longer. At the expiration of this time, he having been entirely free from every symptom of the disease, for more than a week, it was thought safe to dismiss him as cured; which was accordingly done. As before however, resuming his former occupations of labour, the disease again made its appearance, in the course of a week or two, when he was taken with most of the symptoms, which denote the approach of tetanus. These gradually increasing, and being somewhat aggravated, from the exertion made by him to get to the house, soon became violent in any of the preceding attacks, the cold affusions, used as above mentioned, were resorted to the third time, and regularly followed up by, the liberal use of the bark and wine, with the occasional use of an opiate, and although the opium always appeared to have great



however, in alleviating the sufferings of
 the patient, and mitigating the violence of
 the convulsion, it can scarcely, in this case, be
 entitled to as much credit, as might be
 given to the cold affusion, or to the bark
 and wine, for the benefit resulting
 from the employment of these two
 latter means, was in every instance
 evident, as the most violent symptoms
 would be entirely removed, or greatly
 abated by them. Doctor Wright of
 Jamaica gives an account of six cases
 successfully treated by affusions of
 cold water. Doctor Thomas Cochrane
 also gives an instance, in which the
 patient opened his jaws freely, and
 was enabled to walk upright in a day,
 or two after affusions of cold water
 were employed. An advocate for this kind
 of treatment in Colonus, several writers still

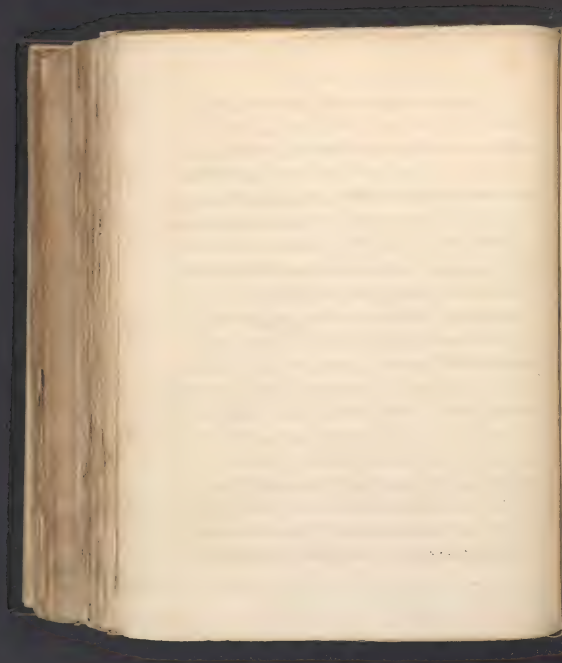


more celebrated than these last, have been mentioned before. In addition to what has been previously mentioned in favour of this mode of treatment, it was found in this third attack, to be equally as beneficial as in any of the foregoing. Existing, however, so great a disposition in the disease to reappear, upon the slightest occasions, after it appeared to be entirely removed, it was thought best to continue the same mode of treatment, though, for a much longer time than had been previously done, with a hope of eradicating the disposition, which appeared to lurk so obstinately in the system. Having been continued on till all the symptoms had disappeared, yet fearing, that perhaps the treatment might not be found adequate to the extinction of the disease,



it was exchanged for the mercurial plan, with a hope of establishing a mercurial action in the place of the tartaric one, which now existed. In this expectation, we were disappointed, for notwithstanding the extensive use of its various preparations, in many ways, it was found, as had been done on previous occasions, to make no apparent impression on the system.

This being the case, its employment was given over, and we had now to trust solely to the cold & mercurial, bark and wine, for the entire elimination of the disease from the system. The employment of these remedies realized our most sanguine expectations, for the disease disappeared upon the use of them, in every instance, and we had every reason to believe that by a continuance of them, if it was of sufficient



dication, the disease might be entirely
 removed. Having been so frequently failed
 in previous attempts to accomplish this
 object, there was regularly maintained
 for several weeks, after every symptom
 had entirely disappeared. In addition, a
 perfect state of rest and tranquillity was
 strictly enjoined upon the patient
 even for a much longer time. As the
 use of the bark and wine reproduced
 the disturbing sense of heat in the stomach,
 of which the patient had before complained,
 they were discontinued, and the cold
 affusions persevered in for a much
 longer time. The patient was also prohibited
 from engaging in any pursuits, that might
 produce excitement or fatigue and in this
 condition of quietude, he was kept for a
 month or two, during which time, the disease
 entirely subsided. The patient was finally

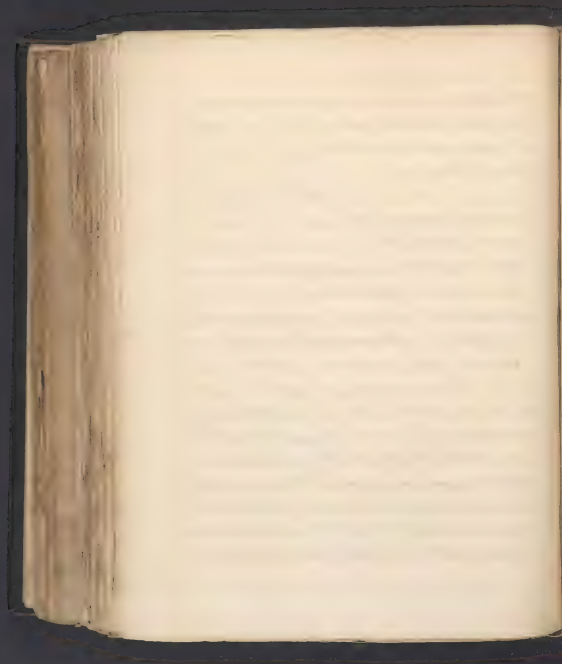


diminished as cured, and this obstinate and formidable disease was at last subdued, no return of the symptoms having been manifested since.

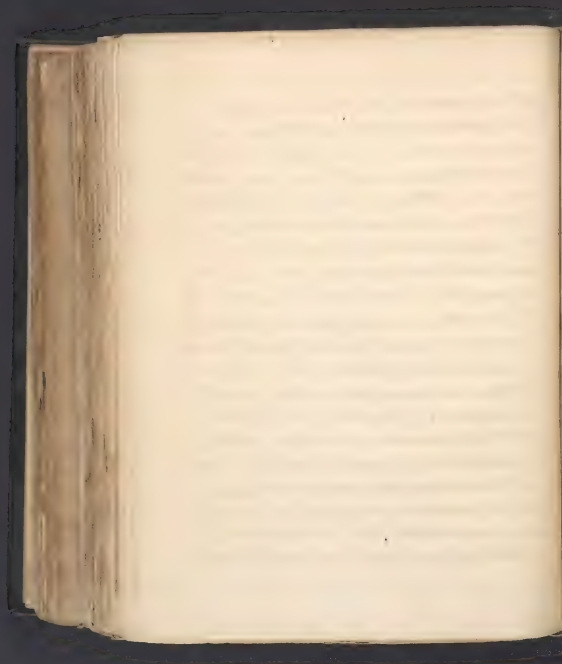
C. G. Corlies, M.D.

and accurate account, which I have given of the above case, and its frequent relapses, so often removed by the same means, and we are not authorized to consider the plan of treatment, as highly calculated to prove successful in this dangerous ailment in our climate. In confirmation of this opinion, I will relate a second case, which together with the first, will more satisfactorily demonstrate the propriety of the practice.

On the first of September, 1822, a strong athletic negro man, aged about six and twenty years, accidentally trod upon a sharp stone, which penetrated between the metatarsal bones of the foot. The stone was extracted soon



after the accident, but in a few days a most formidable attack of tetanus, made its appearance, commencing with almost universal spasm, with scarcely any, or but few premonitory symptoms. The attacks being violent, and following in rapid succession, the sufferings of the patient became so great, that death appeared to be almost inevitable. In this critical condition, the shower bath was employed, and produced a more speedy and complete relief, from every spasmodic affection, than I had ever witnessed in any single instance of its employment. The first bucket full that was showered upon him, entirely dissipated every symptom of the disease, after which he was wiped perfectly dry, put to bed, and a large dose of bark and wine were exhibited. In this way the accession of the next paroxysm was much retarded,



the interval, from one to the other, being greater, than that between any of the preceding paroxysms. In every succeeding paroxysm the employment of these means, was attended with the same happy results. The paroxysms still continued to return during the day, but gradually diminishing in force and frequency. On the following day, they entirely vanished, and left the patient in so debilitated a condition, that the cold affusions were suspended.

Notwithstanding this abrupt discontinuance of the treatment, the disease did not disappear, and the patient gradually recovering from his state of debility in a short time was restored to his usual health.

That the same success would attend this practice in warmer climates, as the East or West-Indies I am unable to assert. I am however inclined to believe that its employment



in those countries might ~~prove~~ useful.

On this subject, we find the testimony of authors to be at variance. Doctor Goddstone of the East Indies informs us, that cold water, universally, proved fatal in this disease. Doctor Rush, very satisfactorily, accounts for this circumstance, from the debilitating effects of that warm climate, inducing such a state of the system, as renders it unable to react under the revulsive effects of cold water.

May we not reasonably conclude then, that the cold water, if used with caution, so as not to reduce the system below the point of reaction, and gradually increasing it according to circumstances, would be as useful, in such a climate as our own;

This opinion I am inclined to adopt.

B No 74 G
309 Walnut

Totanus 1825

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